

## ABSTRACT

1       A data processing apparatus having data cache performs an  
2 N-point radix-R Fast Fourier Transform. If the data set is  
3 smaller than the data cache, the data processing apparatus  
4 performs the Fast Fourier Transform in  $\log_R N$  stages on all the  
5 data set in one pass. If the data set is larger than the data  
6 cache but smaller than R times the data cache, the data  
7 processing apparatus performs a first stage radix-R butterfly  
8 computation on all the input data producing R independent  
9 intermediate data sets. The data processing apparatus then  
10 successively performs second and all subsequent stage  
11 butterfly computations on each independent intermediate data  
12 set in turn producing corresponding output data. During the  
13 first stage radix-R butterfly computations, each of R  
14 continuous sets are separated in memory by memory locations  
15 equal to the size of a cache line.